

**We claim:**

- 1    1.     A packet relay device comprising:  
2            a join request unit operable to transmit a join request to join  
3    a multicast group in response to receiving a join instruction to join  
4    the multicast group, the join instruction transmitted by a mobile  
5    node at least before the mobile node moves between subnetworks;  
6    and  
7            a packet forwarding unit operable to forward subsequently  
8    received multicast packets for the multicast group for a specified  
9    time period to a care-of address in response to receiving location  
10   registration information containing the care-of address of the  
11   mobile node in a foreign subnetwork to which the mobile node has  
12   moved, the location registration information transmitted when the  
13   mobile node has moved between subnetworks,.  
  
1    2.     The packet relay device according to Claim 1, wherein the  
2    packet forwarding means is further operable to stop forwarding of  
3    the multicast packets in response to receiving a forwarding stop  
4    instruction transmitted by the mobile node.

1 3. The packet relay device according to Claim 1, wherein the  
2 packet forwarding means is further operable to determine a  
3 forwarding time period for the multicast packets based on time  
4 period designation information in response to receiving the time  
5 period designation information indicating a specified time period,  
6 the time period designation information transmitted by the mobile  
7 node.

1 4. A mobile node comprising:  
2 a join instruction unit operable to transmit join instructions  
3 to join a multicast group to a location registrar relay device, the  
4 location registrar relay device being the recipient of location  
5 registration information containing one's own care-of address, at  
6 least before the mobile node moves between subnetworks, and  
7 a forwarding request unit operable to transmit a forwarding  
8 request to the location registrar relay device, in response to the  
9 mobile node moving between subnetworks while participating in the  
10 multicast group, whereby multicast packets for the multicast group  
11 are subsequently received by the location registrar relay device to  
12 be forwarded for a time period to a care-of address of the mobile  
13 node after the move.

1 5. The mobile node according to Claim 4, wherein the join  
2 instruction unit is further operable to:  
3 transmit a join request to join the multicast group to a relay  
4 device in a subnetwork to which the mobile node is attached when

5 the mobile node newly joins a multicast group; and  
6 transmit a join instruction to join the multicast group to the  
7 location registrar relay device.

1 6. The mobile node according to Claim 4, further comprising a  
2 forwarding stop instruction unit operable to transmit to the location  
3 registrar relay device a forwarding stop instruction to stop  
4 forwarding of multicast packets by the location registrar relay  
5 device once multicast packets are received from a multicast group  
6 based on a join request after transmitting the join request to join  
7 the multicast group.

1 7. A mobile node according to Claim 4, further comprising a  
2 time period designation operable to transmit information indicating  
3 a specified period of time as the time period to the location  
4 registrar relay device when a subnetwork to which the mobile node  
5 has moved has a multicast packet delivery function; and  
6 transmit information indicating that forwarding should be  
7 continued as the time period to the location registrar relay device  
8 when the subnetwork to which the mobile node has moved has no  
9 multicast packet delivery function.

1 8. A packet forwarding method comprising the steps of:  
2 notifying a home agent for a mobile node that receives  
3 multicast packets whether a foreign subnetwork to which the mobile  
4 node has moved is a multicast protocol compatible subnetwork;

5           encapsulating and forwarding, at the home agent, the  
6   multicast packets to a care-of address of the mobile node for a time  
7   period if, based on content of the notification, the foreign  
8   subnetwork to which the mobile node has moved is a multicast  
9   protocol compatible subnetwork; and

10          continuing to encapsulate and forward, at the home agent,  
11   the multicast packets to the care-of address regardless of the time  
12   period if the foreign subnetwork is not a multicast protocol  
13   compatible subnetwork.

1   9.     The packet forwarding method according to claim 8, further  
2   comprising the step of:

3           including information indicating whether the foreign  
4   subnetwork is multicast protocol compatible in a location  
5   registration message.

1   10.    The packet forwarding method according to claim 8, further  
2   comprising the step of:

3           statically determining, at the home agent, the time period for  
4   performing encapsulated forwarding.

1   11.    The packet forwarding method according to claim 8, further  
2   comprising the step of:

3           indicating to the home agent, from the mobile node, that the  
4   time period that the home agent forwards multicast packets to the  
5   mobile node.

1 12. A packet forwarding method comprising the steps of:  
2 notifying a relay device to which a mobile node that receives  
3 multicast packets was connected in a subnetwork that the mobile  
4 node is moving from as to whether a foreign subnetwork to which  
5 the mobile node is moving is a multicast protocol compatible  
6 subnetwork;  
7 encapsulating and forwarding, at the relay device, the  
8 multicast packets for a time period to a care-of address of the  
9 mobile node in the foreign network to which the mobile node has  
10 moved if, based on content of the notification, the foreign  
11 subnetwork to which the mobile node has moved is a multicast  
12 protocol compatible subnetwork; and  
13 continuing to encapsulate and forward, at the relay device,  
14 the multicast packets to the care-of address regardless of the time  
15 period if the foreign subnetwork to which the mobile node has  
16 moved is not a multicast protocol compatible subnetwork.

1 13. The packet forwarding method according to claim 12, further  
2 comprising the step of:  
3 including information indicating whether the foreign  
4 subnetwork is multicast protocol compatible in a location  
5 registration message.

1 14. A home agent comprising:  
2 a binding cache operable to manage foreign locations of

3 mobile nodes to be managed;  
4 a multicast packet forwarding processing unit operable to  
5 forward multicast packets; and  
6 a packet processing unit operable to perform encapsulated  
7 forwarding of multicast packets for a specific time period  
8 depending on whether multicast packets can be received at a  
9 foreign location of a mobile node.